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TEIMET, PAUL
PROF. LISHENGA, JOSEPHAT
PROF. IRAYA MWANGI
DR. DUNCAN ELLY

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THE EFFECT OF REVENUE DIVERSIFICATION ON RETURN ON ASSETS OF COMMERCIAL BANKS IN KENYA

Teimet, Paul[1], Prof. Lishenga, Josephat[2] Prof. Iraya Mwangi[3], Dr. Duncan Elly[4]

Abstract

Commercial banks are profit maximizers and perceive revenue diversification as one of the alternative strategies to cushion and stabilize stakeholder's returns. This paper examines whether the diversification level in interest and non-interest revenue affects return on assets of commercial banks in Kenya. It used unbalanced panel dataset sourced from 42 commercial banks spanning 2009 to 2018. The paper measured diversification level using Hirschman-Herfindahl index and captured return on assets using earnings before interest over total assets. The resources based theory anchors the study and evaluated the direction and magnitude of the relationship between the variables using panel data regression. The correlation analyses revealed a moderate diversification level for both interest and non-interest income. Further, the inferential random-effect results indicated that return on assets related positively with both interest and non-interest diversification. The paper recommends a policy framework that allows banks to engage in various interest-bearing activities to maximize the bank's return on assets.

Keywords: Revenue diversification, interest income, non-interest income, returns on assets, commercial banks.

[1] PhD Candidate, Department of Finance and Accounting School of Business, University of Nairobi. *pteimet@yahoo.com*
[2] Department of Finance and Accounting, School of Business, University of Nairobi
[3] Department of Finance and Accounting, School of Business, University of Nairobi
[4] Department of Finance and Accounting, School of Business, University of Nairobi

Introduction

The banking regulatory squeeze has prompted banks to shift in the intermediation business tone from profit growth to diversification, scale economies and returns. This has notably ignited a wave of banking consolidation as a way of diversifying in banking activities from the traditional to non-traditional model (Goddard, McKillop & Wilson 2008). The paradigm shift in the banking activities to include non-interest-bearing activities targets at generating sustainable interest margin over time. Banks use revenue diversification strategy to stabilize the key financial indicators whilst gaining market-power (Gambacorta, Scatigna & Yang, 2014). Worldwide, the banking business is heavily regulated and more sensitive to political and economic shocks. These combined subvert the generation of interest income component with a ramification effect of reducing interest margin, a key pillar to banks returns on assets (Naceur & Omran, 2011). Ultimately, the phenomenon weakens financial indicators and as such, depletes bank's capital base with a net effect of shrinking the bank's funded activities.

To hedge the aforementioned, the industry players and regulators have equally pushed for banking consolidation, however, with divergent motives. For instance, the banking consolidation drive from commercial banks perspective could be the need to expand in the market activities or outcompete competition and circumvent the tightened regulatory framework (Huseyin, 2018). On the contrary, the perspective of the banking regulators could be the need to rescue the vulnerable and weaker banks or maintain public confidence and by extension, economic stability. Therefore, banking consolidation allows banks to circumvent and diversify into unfamiliar territorial activities such as bancassurance, trading in foreign exchange and other investments. These generally generate non-interest income component, which banks perceive as less regulated stream and relatively stable (Teimet, Okaka & Aywa 2011). It is interesting to note that commercial banks use non-interest-bearing activities to attract and retain loyal customers. For example, during a harsh economic condition, a higher default rate in loans could be inevitable. In such a case, banks lower the interest rates for loans whilst increasing non-interest income. This strategy according to Stiroh (2010), allows banks to smoothen the interest margin gap. This implies that banks manipulate interest rates to achieve the desired outcome using non-interest-bearing activities. Therefore, the option becomes a strategic line for banks to maintain interest margin. Thus, during a harsh economic condition, regulatory squeeze or stiff competition, banks with more revenue drivers outwit those with fewer revenue drivers (Mahmudi, Ismael, Ananda & Khusaini, 2014).

In the context of Kenya, the banking landscape has changed drastically. The dynamics in the regulatory framework has prompted the witnessed banking consolidation wave across banks and non-banks. These events are geared towards enhancing assets quality and likewise maintaining soundness in the sensitive financial system. That is, in the quest for a larger, well-capitalized and stable entity, commercial banks have either merged or been acquired. For instance, according to the central bank of Kenya annual report 2018, fifteen banking consolidations occurred in the period between 2013 and 2018. This is an average of three consolidations per year as reported by Cytonn Investments Limited (2017). In the concept, the relatively stronger banks acquired the weaker banks and seamlessly commercial banks navigated the murky regulatory environment, exacerbated by stiff competition among banking sector players (CBK, 2018). The banking merger and acquisitions strategy results in a net effect of increasing the customer base. Banks offer bundled products and services to ostensibly steady profitability, hitherto, constrained by interest rate capping on loans. This enables banks to expand in both funded and non-funded revenue streams (Gambacorta et al., 2014). With this trend, seemingly Kenyan banks are overzealously bundling banking services to form a financial supermarket, perhaps as a way of increasing non-interest revenue base. Thus, banks perceive income diversification achieved through multiple interest-bearing activities as a possible solution to the problems related to return on assets performance. Scholars and experts are puzzled and equally, face a dilemma as to whether the witnessed shifts in the banking activities to non-banking activities could stabilize the bank's return on assets.

The paper anchors on the resource-based theory (RBT). Wernerfelt (1984) proposed RBT as performance theory, as an extension of Penrose (1959) seminal work. Resources based view has since dominated as a theory to explain the inter-firm performance differences (Ligang, Vedastus & Yang, 2011). The theory argues that superior performance emanates from resources deployment (Sirmon, Gove & Hitt, 2008). The theory proposes that a firm with several idle or unutilized production capacity for instance technology endowment, market capability, resourceful assets, human skills etc., could easily be motivated to engage in several lines of banking business compared to a bank with less endowment. Ligang, Vedastus and Yang (2011) used resources based theory to gauge the performance of 15 commercial banks in Tanzanian. The study used unbalanced data set for the period spanning 2005 to 2009. The study found that banks resources capabilities greatly influence banks performance. Arafat, Warokka, Buchdadiand Suherman (2013) suggested that the theory emphasizes on the availability of unemployed resources, which motivates a firm to venture into more profitable market segments. The finding supports a study done by Ahuja and Novelli (2017) which found that firms use diversification strategy to generate different revenue lines, which are affected differently by a given financial shockwave. As such, the firms' returns over time would stabilize and thus justify improvement in returns performance (Chiorazzo, Milani & Salvini, 2008). Based on the assertion that stabilization of return is the preference of banks, diversification would logically be expected to relate positively with returns on assets. However, as a bank expands in revenue-generating activities, it implies an additional intermediation line, which makes management function complex as well as an outburst in expense control (Mahmudi et al., 2014).

Despite several studies on revenue diversification and returns on assets, the findings from developed markets conflict with each other despite using the same period data. For example, EU zone studies argued that revenue diversification enhances returns on assets (Staikouras & Wood 2006; Chiorazzo et al. 2008; Sanya & Wolfe 2011; De Young &Torna 2013; Gambacorta et al., 2014; Brighi &Venturelli, 2015; Saunders et al., 2016; and Wallmeier & Guerry, 2017). Nisar, Peng, Wang and Ashraf (2018) examined the impact of revenue diversification on the profitability of banks using a panel dataset from 200 south Asian countries over the period 2000–2014. The study found that revenue diversification into non-interest income has a positive impact on the profitability. Mundi (2019) investigated the impact of income diversification on banks performance using a database from 74 commercial banks spanning 2005-2014. The study found a moderate positive relationship between fee income and return on equity & fund income and return on equity. Huseyin (2018) paper examined the impact of non-interest income on bank profitability using a data set from and across 2005 countries from 1999-2013. The study indicated that non-interest income had a positive impact on banks' profits for high-income countries.

On the contrary, USA studies suggest that diversification discounts and weakens banks returns on assets (De Young & Rice, 2004; and Stiroh, 2004). In developing markets, most studies found diversification favourable in strengthening returns (Kiweu, 2012; Natalia et al., 2016; Tarazi et al., 2013; and Teimet et al., 2011). The logic contrasts negative findings by Mulwa and Kosgei (2016). Besides, some scholars have argued that banks in developing markets need to widen the scope of activities due to underdeveloped financial systems and inherent market failure (Khanna & Rivkin, 2001). The question therefore is; what is the relationship between the degree of diversification and return on assets of commercial banks in Kenya. That is, whether banks would be better off by remaining focused on the traditional banking activities or better bundled along with the non-traditional activities as a compliment.

In order to answer the research question successfully would add value to the theory building in the field of finance and extend the theoretical knowledge frontier in diversification and returns relationships. The understanding would assist in resolving the conflicting relationship puzzle, whilst appealing to scholars as a basis for future research. To address the above research question, the study assessed the relationship between return on assets and both interest and non-interest diversification. The study addressed the objective through the following three null-hypotheses:

H_1: Interest diversification does not significantly affect return on assets,

H_2: Non-interest diversification does not significantly affect return on assets,

H_3: Interest and non-interest diversification do not jointly affect return on assets.

The hypothetical relationships were as presented in Figure 1.

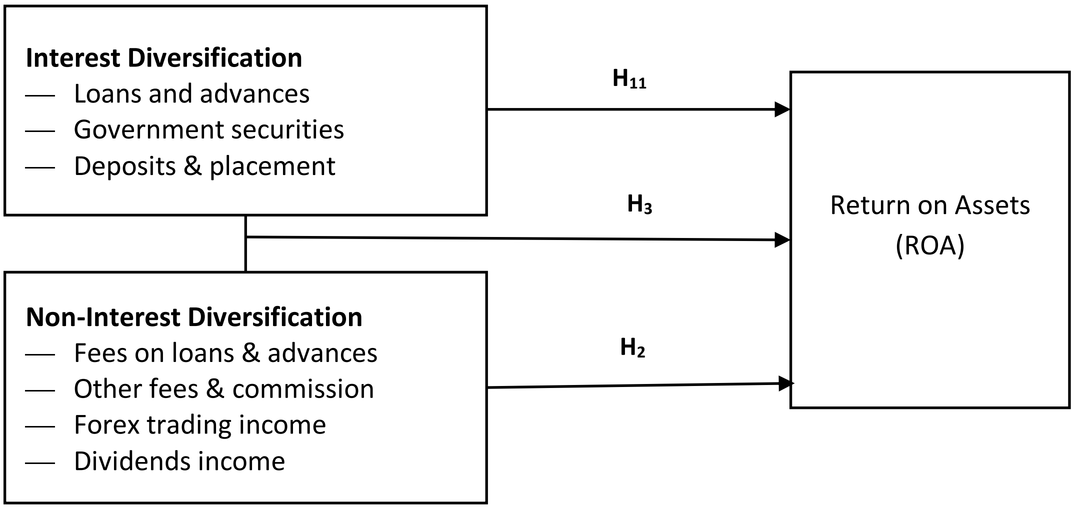

Figure 1: Conceptual Framework

Source: Author, 2020.

Methodology

The study used panel data from forty-two commercial banks over ten years (2009-2018) to examine the effect of revenue diversification on return on assets of commercial banks. This generated four-hundred-twenty data points. The study considered the use of panel data appropriate because a panel data does not limit the analysis to the use of a specific statistic rather it accommodates a wider range of statistical tests available for analysis. According to Gujarati (2004), panel data analysis achieves better regression results because it allows for control of unobserved heterogeneity and recognizes cross-sectional as well as time-series dimensions. This ultimately reduces the bias of the estimators.

The literature reviewed revealed that theorists and external analysts mostly adopt sales, assets or equity as a metric measure to gauge firms' scale returns. In the banking context, financial performance can be measured using three approaches: the traditional model, the economic added model and the market-based model (Cho & Pucik, 2005). The traditional method includes returns on assets (ROA), returns on equity (ROE), returns on capital employed and interest margin. The current study used ROA, a widely used index as it satisfies all stakeholders of funds such as shareholders, debtors, creditors, debenture, bondholders, etc. This satisfaction feature makes ROA broader and useful compared to ROE, which measures returns only from the shareholders' perspective (Olusegun et al., 2013). Experts perceive the measure as the most suitable for the banking sector since it shows how best a bank uses its investment funds in generating returns (Almazari, 2014). The study measured ROA as a ratio of earnings before interest and tax (EBIT) over the total assets (TA) as expressed in equation 1.

$$ROA = \frac{EBIT}{TA} \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

The study measured diversification using the Herfindahl—Hirschman Index (HHI). HHI is a composite index introduced by Hirschman (1945) and Herfindahl (1950) independently. Equation (2) represents the Herfindahl-Hirschman model.

$$\mathrm{HHI} = \sum_{i=1}^{n} \left(\frac{xi}{Q}\right)^2 \quad \ldots\ldots\ldots\ldots \quad (2)$$

Where : $Q = \sum_{i=1}^{n} xi + \cdots. + xn$ the total exposure, $\sum$ = Sum, HHI = diversification index, and x_i = exposure variable. The index is a sum-up of weighted squared exposures as a percentage of total exposure and range from one to zero. The higher index reflects concentration while a lower value reflects diversification. However, for ease of interpretation, the study adopted an adjusted Herfindahl-Hirschman Index, which is a unit less the index (1-HHI) so that the index level increases with diversification level.

$$1 - \mathrm{HHI} = \sum_{i=1}^{n} \left(\frac{xi}{Q}\right)^2 \quad \ldots\ldots \quad (3)$$

The diversification index ranges from zero to one (zero< HHI < 1). Where zero is the least diversified (focused) bank while one is a fully diversified bank. The rule of thumb is that diversification index less or equal to 0.25 ($0 \leq HHI \leq .25$) implies a focused (undiversified) bank, while greater than or equal to 0.75 ($HHI \geq .75$) imply a fully diversified. A moderately diversified bank falls within the two extremes ($.25 \leq HHI \leq .75$). Subsequently, several other authors have developed and adopted the adjusted index to measure diversification in the banking industry (Stiroh, 2004; Staikouras & Wood, 2006; and Chiorazzo, et al., 2008).

As earlier alluded, commercial banks generate revenue from two components: interest income and non-interest income. Equations (4) and (5) represent the equivalent construction of the interest diversification (HHI_{II}) and non-interest diversification (HHI_{NII}) indices respectively.

$$HHI_{II} = 1 - \left\{ \left(\frac{LA}{TII}\right)^2 + \left(\frac{GS}{TII}\right)^2 + \left(\frac{DP}{TII}\right)^2 + \left(\frac{OII}{TII}\right)^2 \right\} \ldots\ldots\ldots\ldots\ldots \quad (4)$$

$$HHI_{NII} = 1 - \left\{ \left(\frac{FLA}{TNII}\right)^2 + \left(\frac{OFC}{TNII}\right)^2 + \left(\frac{FEX}{TNII}\right)^2 + \left(\frac{DI}{TNII}\right)^2 + \left(\frac{ONI}{TNII}\right)^2 \right\} \ldots\ldots \quad (5)$$

Where: HHI_{II} is the interest diversification, HHI_{NII} is non-interest diversification, 1 is a unit, TII is total interest income, TNII is total non-interest income, LA is interest from loans and advances, GS is interest from government securities, DP is interest from deposits and placements, OII is other interest income. LA is fees earned from loans and advances, OFC is other fees and commission, FEX is foreign exchange trading income, and DI is the dividends income.

Model Specification

The study used the Hausman (1978) test to assess for the model suitability. The null hypothesis was that the random-effects model was appropriate while the alternative was the fixed-effect model was appropriate. The results were as presented in Table 1.

Table 1: Correlated Random Effects-Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.228757	2	0.8919

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
Interest diversification	5.804552	5.652261	0.104581	0.6377
Non-interest diversification	1.996429	1.997778	0.055077	0.9954

Source: Research Data 2020

Table 1 shows an insignificant chi-square (χ^2 = 0.229, df = 2, P = 0.89), which implied that the random-effect model was the most appropriate. The study adopted the prediction model as shown in equation (6).

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{2it} + u_i + \varepsilon_{it} \ldots\ldots \quad (6)$$

Where : Y_{it} = dependent variable of bank *i* at time *t*, *i* = observation, *t* = time, X_{it} = vector of independent variables, β_0 = constant term, β_1 and β_2 = coefficients of independent variables, u_i = Random error term, ε_{it} = idiosyncratic disturbances. Equation (6) assumes that the slope (β_1) is a random mean and the intercept for each bank is $\beta_{1i} = \beta_1 + \varepsilon_i$.

Panel Data Diagnostic Tests

The study assessed whether revenue diversification predicts returns on assets precisely. Since the study used the total population in the analysis, the results were interpreted using significance of the t-statics, F-statistic; adjusted R squared ($\bar{R}^2$) correlation coefficient. $\bar{R}^2$ informed on the usefulness of each variable in accounting for the dependent variable while t-statistics revealed the regression power, which informed on the strength of the relationship between the dependent and independent variable. F-statistic assessed whether the overall linear regression models were of functional fitness to the research data and indicated the significance level of influence of the predictor variables to the response variable.

Data Stationarity

The study explored data stationarity and cointegration order 1(*d*) using panel unit root tests. That is the Levin, Lin & Chu (LCC), which assumed a common unit root process, and the ADF-Fisher, which assumed the individual unit root process. The panel unit root test results were as shown in Table 2.

Table 2: Panel Unit Root Test

Variable	LCC	Prob.	ADF	Prob.	Cross-section	Obs
ROA	-11.304	0.00	152.368	0.00	42	356
HHI_{II}	-13.301	0.00	175.517	0.00	42	359
HHI_{NII}	-16.147	0.00	226.449	0.00	42	361

Probabilities for Fisher tests computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: Research Data 2020

Table 2 illustrates that the data for all variables had no unit root at level with statistical significance ($p <. 05$). Therefore, based on the outcome the variables data were stationary at a 5 percent significance level and exhibits integration order 1(*0*). Therefore, the panel data variables co-integrated well without first-order differentiation and as such, it was safe to adopt other time-series models.

Normality Test

The study used the Kolmogorov-Smirnov (K-S) test to assess for normality distribution. The null hypothesis was that sample distribution followed a normal distribution. The insignificance ($P > .05$) outcome of the K-S test was desired and the results were as presented in Table 3.

Table 3: Kolmogorov-Smirnov Test

		HHI_{II}	HHI_{NII}	ROA
N		420	420	420
Normal Parameters[a,b]	Mean	.3562	.6365	2.3181
	Std. Deviation	.12387	.09505	2.76709
Most Extreme Differences	Absolute	.057	.134	.080
	Positive	.038	.110	.040

	Negative	-.057	-.134	-.080
Kolmogorov-Smirnov Z		1.159	2.755	1.633
Asymp. Sig. (2-tailed)		.136	.000	.010

a. Test distribution is Normal. b. Calculated from data.

Source: Research Data 2019

Table 3 shows that only interest diversification had insignificant K-S test results, which confirmed the data normally. However, return on assets and non-interest diversification data did not follow a normal distribution, which was attributed to the mild outliers. However, the study ignored the assumption in consideration of the large sample size. Further, the study examined the normality assumption for the variables graphically using normal histogram for return on assets as shown in Figure 2.

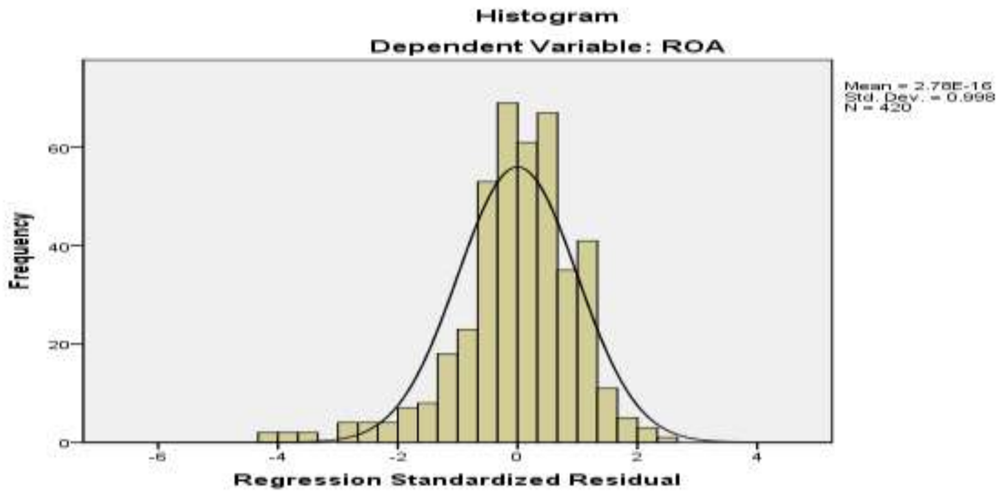

Figure 2: Histogram for standardized residual for the dependent variable

Figure 2 shows that the data for return on assets (ROA) approximated the normal distribution with the peak clustered around zero, despite a few extreme spread to the negative side of the histogram. The figure reveals a symmetrical shape, meaning the data met normality assumption criteria.

Descriptive Statistics

In order to visualize the panel data, the study employed descriptive statistics aimed at making the presentations more meaningful and straightforward in interpretations. The descriptive statistics were as shown in Table 4.

Table 4: Descriptive Statistics

		ROA	HHI_{II}	HHI_{NII}
N	Valid	420	420	420
	Missing	0	0	0
Mean		2.318	.356	.636
Median		2.495	.360	.660
Std. Deviation		2.767	.123	.095
Skewness		-.928	-.150	-1.496

Kurtosis	1.606	-.432	2.628
Minimum	-8.38	.011	.241
Maximum	10.40	.651	.771

Source Research Data 2020

Table 4 reveals that the mean ($\bar{x}$) score and standard deviation (σ) for return on assets, interest diversification and noninterest diversification were 2.3±2.76, .35±.12 and .636±.09 respectively. In other words, interest diversification level was 36 percent ($\bar{x} = .356$) while that of non-interest was 64 percent ($\bar{x} = .636$). The results depicted a moderate diversification level with higher index observed in non-interest component than in interest component. The results reveal that both skewness and kurtosis were within the accepted range of two (K = ±2) and three (K = ±3) respectively, as suggested by George and Mallery (2010). Further analysis showed that all variables exhibited negative skewness, implying that most of the observations were to the right (or a long left-tailed distribution) of the mean value than expected in a normal distribution. This means that the extreme values were very small which suppressed the mean scores and as such, the median values were larger than the mean values as exhibited by all other variables. Apart from interest diversification, which exhibited negative Kurtosis, noninterest diversification and return on assets displayed positive Kurtosis. The positive kurtosis meant a peaked (leptokurtic) distribution relative to a normal distribution, while negative implied a platykurtic distribution corresponding to a normal distribution. The results showed that there were no challenges associated with outliers and as such, the data was good for panel regression analysis.

Correlation Analysis

The study assessed the strength of the relationships between variables using Pearson correlation as presented in Table 5.

Table 5: Correlation Matrix

		ROA	**HHI_{II}**	**HHI_{NII}**
ROA	Pearson Correlation	1		
	Sig. (2-tailed)			
HHI_{II}	Pearson Correlation	.215**	1	
	Sig. (2-tailed)	.000		
HHI_{NII}	Pearson Correlation	.104*	.161**	1
	Sig. (2-tailed)	.034	.001	
	N	420	420	420

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Source Research Data 2020

Table 5 demonstrates that return on assets had a statistically significant positive relationship with both interest diversification (N (420) r = 0.215, p = 0.015) and non-interest diversification (N (420) r = 0.104, p = 0.034). This implies that return on assets increases with an increase in diversification level of interest and non-interest income. Based on the Pearson correlation guidelines criteria as suggested by Cohen et al. (2003), the correlation matrix indicated that the association was moderate and as such, there were no trace autocorrelations problems between any two variables and was safe to execute the panel regression investigation.

Findings and Discussions

The objective of the study was to assess whether interest and non-interest diversification affect return on assets. The study estimated the coefficients of the panel equation between the dependent variable and the independent variable using the estimated general least square (EGLS) method. The study adopted the random effect prediction model as suggested by the insignificance Hausman test results. The first null hypothesis (H_1) stated that interest diversification does not significantly affect return on assets. The panel regression results were as shown in Table 6.

Table 6: Regression of Interest Diversification and Return on Assets

Dependent Variable: Return on Assets				
Variable	**Coeff**	**S.E**	**t-stat**	**Prob.**
Constant	-0.030	0.640	-0.047	0.9620
Interest diversification HHI_{II}	5.738	1.466	3.914	0.000
Effects Specification		**S.D.**	**Rho**	
Cross-section random		2.267	0.365	
Idiosyncratic random		2.986	0.634	
Weighted Statistics				
R-squared	0.035	Mean var		0.791
Adjusted R-square	0.033	S.D var		3.035
S.E. of regression	2.985	Sum squared r		3724.5
F-statistic	15.335	Durbin-Watson		1.252
Prob(F-stat)	0.000			

Source: Research Data 2020

Table 6 displays the Swamy and Arora estimator of component variances with significant relationship between return on assets and interest diversification (β_0 = -0.03, β_1 = 5.74, t = 3.91, P = 0.00). The effects specification revealed a cross-section and idiosyncratic standard deviation of 2.26 and 2.99. The corresponding error associations were 36 percent (Rho = 0.365) and 63 percent (Rho = 0.634) respectively. Further, the weighted statistics were statistically significant (R^2 = 0.035, F = 15.33, P = 0.00, d = 1.25). This implies that the interest diversification coefficients were significantly different from zero ($\beta \neq 0$, $p < 0.0$). Thus, the study rejected the first null hypothesis (H_1) and concluded that interest diversification significantly affect return on assets of commercial banks in Kenya. Thus, the prediction model was as shown in equation (7).

$ROA_{it} = \beta_0 + \beta_1 (HHI_{II})_{it} + \mu_i + \varepsilon_{it}$

$ROA = -0.031 + 5.74 (HHI_{II})$………………… (7)

Where : ROA is the predicted return on assets, -0.03 is the value of ROA when HHI_{II} is zero, and 5.74 is the estimated change of HHI_{II} on ROA. Equation (7) means that all other factors held constant, a unit increase in interest diversification, return on assets increases by 5.74 units. Therefore, based on the panel least square regression assessment, the study found a significant positive relationship between interest diversification and return on assets. The finding concurs with studies done by Natalia, Kurniawan and Firsty (2016) and Saunders et al., (2016) but contrasts with the negative finding by Mulwa and Kosgei (2016) which used geographical and assets diversification.

The second null hypothesis (H_2) stated that non-interest diversification does not significantly affect return on assets. The regression results were as shown in Table 7.

Table 7: Regression Results for Non-Interest Diversification and Return on Assets

Dependent Variable: Return on Assets				
Variable	**Coeff**	**SE**	**t**	**Prob.**
Constant	-1.204	0.933	-1.289	0.197
Non-interest diversification HHI_{NII}	5.155	1.375	3.749	0.000
Effects Specification	**S.D.**		**Rho**	
Cross-section random	2.24		0.359	
Idiosyncratic random	2.99		0.640	
Weighted Statistics				
R-squared	0.032	Mean dependent var		0.800
Adjusted R-squared	0.030	S.D. dependent var		3.039
S.E. of regression	2.992	Sum squared resid		3743.292
F-statistic	14.102	Durbin-Watson stat.		1.284
Prob(F-statistic)	0.000			

Source: Research Data 2020

Table 7 displays the Swamy and Arora estimator of component variances. The results showed a significant relationship between return on assets and non-interest diversification ($\beta_0 = -1.2$, $\beta_1 = 5.2$, $t = 3.7$, $P = 0.00$). The effects specification revealed a cross-section and idiosyncratic standard deviation of 2.2 and 2.9 with the corresponding error association of 36 percent (Rho = 0.359) and 64 percent (Rho = 0.64) respectively. Further, the weighted statistics were statistically significant ($R^2 = .033$, $F = 14.1$, $P = 0.00$, $d = 1.28$). This implies that non-interest diversification coefficients were significantly different from zero ($\beta \neq 0$, $p < 0.0$). As such, the study rejected the second null hypothesis and concluded that non-interest diversification significantly affect return on assets of commercial banks in Kenya. The prediction model was as shown in equation (8).

$ROA_{it} = \beta_0 + \beta_1 (HHI_{NII})_{it} + \mu_i + \varepsilon_{it}$

$ROA = -1.2 + 5.2(HHI_{NII})$........ (8)

Where : ROA is return on assets, -1.2 is ROA when HHI_{NII} is zero, 5.1 is the estimated change of HHI_{NII} on ROA. Equation (8) means that for every unit increase in non-interest diversification, the predicted return on assets increases by 5.1 units, all else unchanged. Therefore, based on the panel least square regression assessment, the study found a significant positive linear relationship between non-interest diversification and return on assets. The finding supports positive findings reported by Tarazi et al., (2013), Gambacorta et al., (2014), Brighi, and Venturelli, (2015). However, it contrasts with the negative findings by De Young and Rice (2004), Stiroh (2004) and Goddard, et al. (2008). These contrasting findings could be associated with the accounting treatment and the era in which the earlier studies were undertaken.

The third null-hypothesis (H_3) stated that interest and non-interest diversification do not jointly affect return on assets. The results were as shown in Table 8.

Table 8: Regression Results for Non-Interest Diversification and Return on Assets

Dependent Variable: Return on Assets				
Variable	**Coeff**	**S. E**	**t-stat**	**Prob.**
Constant	-2.566	1.005	-2.552	0.011
Interest diversification (HHI_{II})	5.048	1.467	3.441	0.000
Non-interest diversification (HHI_{NII})	4.457	1.371	3.251	0.000
Effects Specification		**S.D.**	**Rho**	
Cross-section random		2.283	0.374	
Idiosyncratic random		2.951	0.625	
Weighted Statistics				
R-squared	0.059	Mean dependent var		0.77
Adjusted R-squared	0.055	S.D. dependent var		3.031
S.E. of regression	2.946	Sum squared resid		3620.
F-statistic	13.197	Durbin-Watson stat		1.29
Prob(F-stat)	0.000003			

Source: Research Data 2020

Table 8 shows a statistical significant relationship between return on assets and both interest diversification ($\beta_1 = 5.05$, $t = 3.44$, $P = 0.00$) and non-interest diversification ($\beta_2 = 4.46$, $t = 3.25$, $P = 0.00$). Further, the model revealed a cross-section and idiosyncratic standard deviation of 2.28 and 2.95 with the corresponding error terms of 37 percent (Rho = 0.374) and 63 percent (Rho = 0.625) respectively. The overall model weighted statistics were statistically significant ($R^2 = .059$, $F = 13.2$, $P = 0.00$, $d = 1.3$). The statistical significance implied that interest and non-interest diversification coefficients were significantly different from zero ($\beta \neq 0$, $p < .05$). Based on the results, the study rejected the third null hypothesis (H_3) and concluded that interest and non-interest diversification jointly affects return on assets of commercial banks in Kenya. Thus, the prediction model was as shown in (9).

$$ROA_{it} = \beta_0 + \beta_1 (HHI_{II})_{it} + \beta_2 (HHI_{NII})_{it} + \mu_i + \varepsilon_{it}$$

$$ROA = -2.6 + 5.1(HHI_{II}) + 4.5(HHI_{NII}) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (9)$$

Where : ROA is the predicted return on assets, representing the dependent variable, -2.6 is the value of ROA when both HHI_{II} and HHI_{NII} values are zero, 5.1 is estimated HHI_{II} effect on ROA when HHI_{NII} value is zero and 4.5 is estimated HHI_{NII} effect on ROA when HHI_{II} value is zero. Equation (9) results mean that with a unit increase in both interest and non-interest diversification, return on assets increases proportionately by 5.1 and 4.5 units, ceteris paribus. Put differently, for every standard deviation on both interest and non-interest diversification, return on assets deviates by 3.031, ceteris paribus. The findings were consistent with previous studies, which suggested a positive linear relationship between the degree of diversification and returns on assets (Sanya & Wolfe, 2011; Kiweu, 2012; De Young & Torna, 2013). However, the current findings contrast with studies, which suggested negative effects of diversification on returns on assets (De Young & Rice, 2004; Stiroh, 2004; Goddard, et al. 2008; and Mulwa & Kosgei 2016). In summary, the findings of this study demonstrated that the degree of revenue diversification positively influences returns on assets of commercial banks in Kenya.

Conclusion and Policy Implication

The study observes that during the study period, commercial banks in Kenya embraced non-traditional banking activities to complement the traditional banking activities. The diversification levels for interest and non-interest incomes were 36 percent and 63 percent respectively. Based on the first null hypothesis (H_1) tests results, the study concluded that returns on assets related positively with interest diversification. Based on the second null hypothesis (H_2) test results, the study concluded that return on assets related positively with non-interest diversification. Based on the last null hypothesis (H3) test results, the study concluded that jointly interest diversification and non-interest diversification affects positively returns on assets.

The analysis model for prediction revealed that commercial banks in Kenya embraced revenue diversification as an expansion strategy. This implies that a bank can use consolidation as a mechanism to achieve activities diversification to improve on the returns. The study showed that return on assets move in a similar direction with both interest and noninterest diversification index and therefore the growth of return on the asset is associated with the diversification levels of revenue streams. Thus, the stability of returns in commercial banks is associated with revenue diversification stability. The findings contribute to the pool of knowledge of the decomposed interest and non-interest diversification and returns on assets relationships with implications to the bank management, bank regulators and potential investors. The study adds value to the theory building and extends the knowledge frontier in diversification-performance relationships. While providing an evidence-based integrated theoretical framework, it also links the concepts together through the resource-based theory. The study recommends a policy adjustment on the interest ceiling cap that was enacted the banking (Amendment) Act 2016. The legislation of standard interest rate disclosure and interest rate capping has a net effect of suppressing the interest margin spread.

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